

### **REMARKS**

Claims 1-10 are pending in this application. Claims 1, 2, 4-7, 9, and 10 have been amended. No new matter has been added.

#### **Objections to the claims**

By the Office Action, claim 6 has been objected to for purportedly failing to further limit the subject matter of a previous claim. The Applicant respectfully disagrees. However, to expedite prosecution of the application, the claim has been amended in a way believed to overcome the objection. Accordingly, withdrawal of the objection is respectfully requested.

#### **Rejections of claims under 35 U.S.C. §112, first paragraph**

By the Office Action, claims 1-10 stand rejected under 35 U.S.C. §112, first paragraph for purportedly failing to comply with the enablement requirement. Specifically, the Office Action asserts that undue experimentation would be required to determine how to make and use fluorinated organic substances with a refractive index of 1.30 to 1.55 because one of ordinary skill in the art would be required to physically test each and every fluorinated organic substance to find a suitable compound (see, e.g., Office Action dated February 18, 2009, p. 3-5, section 6-7). The Applicant respectfully disagrees. The optical properties of fluorinated organic substances are likely readily available to those of ordinary skill in the art in materials handbooks and similar reference materials in the relevant literature. Thus, one of skill in the art would only need to cross reference the claimed index of refraction with the claimed fluorinated organic materials in such references to find suitable compounds. The task is especially facilitated in view of quick and efficient electronic searching tools and indices widely available in the field.

Furthermore, it should also be noted here that the discovery of the outcoupling effect of the substances having a refractive index of 1.30 to 1.55 is a significant contribution to the art. As discussed in the Specification, optimal refractive indices of OLED devices were known to be about 1.7-1.9 (see, e.g., Specification, p. 1, lines 14-19). Not only has the Applicant discovered that the optimal refractive index for outcoupling effects in OLED or poly LED devices using

fluorinated organic substances is 1.30 to 1.55, but the Applicant has also discovered that the fluorinated organic materials with refractive indices 1.30 to 1.55 outcouple light considerably better than the materials employed in the art at the time. Thus, the refractive index is not some inherent property of conductor materials used in the art, as asserted throughout the Office Action (see e.g., Office Action, p. 6, para. 2). Rather, the claimed refractive index is a teaching that is a substantial departure from the common practice and that provides a considerable benefit which has hitherto not been appreciated in the art. As such, the Applicant respectfully requests that the claimed refractive index be given due recognition and weight during examination of the application.

Therefore, withdrawal of the rejection is respectfully requested for at least the reasons discussed above.

**Rejections of claims under 35 U.S.C. §112, first paragraph**

By the Office Action, claims 1-10 stand rejected under 35 U.S.C. §112, second paragraph for purportedly failing to particularly point out and distinctly claim the subject matter which the Applicant regards as the invention. Specifically, the Office Action asserts that claims 1 and 5 are indefinite because they are purportedly in an improper Markush format due to the “and/or” recitation. The claims have been amended in a way believed to overcome the rejection (see, e.g., MPEP §2173.05(h)(II)).

It should be noted that “and/or” terms in the claims were replaced with “or” for clarity purposes. The amendments should not be construed as limiting the scope of the claim, as any material that includes two or more of the alternative elements inherently includes at least one of the claimed elements.

**Rejections of claims under 35 U.S.C. §102(b)**

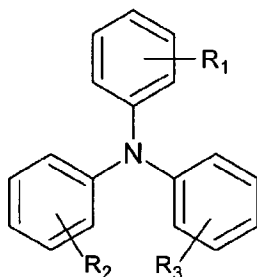
By the Office Action, claims 1-7, 9 and 10 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent Publication No. 2002/0094452 (hereinafter 'Ueda').

Claim 1 recites:

A conductor material for LEDs for improving the light outcoupling, wherein the conductor material is at least one of hole conductor material, electron conductor material or emitter material,  
the conductor material comprises at least one conductive fluorinated organic substance having at least one fluorinated alkyl substituent, one fluorinated alkenyl substituent or one fluorinated alkynyl substituent, wherein at least two fluorine atoms are bonded to at least one carbon atom of the fluorinated substituent, and  
the conductive fluorinated organic substance has a refractive index of  $\geq 1.30$  and  $\leq 1.55$ .

In support of the rejection of claim 1, the Examiner has stated that Ueda discloses compounds that inherently have an index of refraction between the ranges recited in claim 1 because they are within a formula described in the Specification as having the claimed index of refraction property. Specifically, the Examiner has asserted that Ueda discloses compounds that are within formula XIX, which has been claimed in claim 7. The Applicant respectfully disagrees.

As noted in the Applicant's response submitted on December 5, 2008, Ueda does not disclose that any of its compounds have an index of refraction of 1.30 to 1.55. In addition, Ueda seemingly does not anticipate formula XIX, as asserted in the Office Action. Formula XIX includes the following:



Formula XIX

in which R1, R2, R3, R4, R5, R6, R7, R8 and R9 are at least partially identical or different and are selected from the group comprising hydrogen, hydroxyl, alkyl, alkenyl, alkynyl, alkoxy, aryl, alkylene, arylene, amines, halogen, carboxylate derivatives, cycloalkyl, carbonyl derivatives, heterocycloalkyl, heteroaryl, heteroarylene, sulfonate, sulfate, phosphonate, phosphate, phosphine or phosphine oxide, wherein at least one R1, R2, R3, R4, R5, R6, R7, R8 or R9 represents a fluorinated alkyl substituent, a fluorinated alkenyl substituent or a fluorinated alkynyl substituent in which at least two fluorine atoms are bonded to at least one carbon atom; and in which n = 1 to 10,000,000.

Contrary to the assertions posed in the Office Action, compounds 22-29 and compounds 39-41 of Ueda do not conform to formula XIX. Formula XIX clearly indicates that, besides the bond to the nitrogen, only one group is bonded to each “benzene” ring. As understood in the art, where there are no additional bonds illustrated in a sketch that are required to complete a molecule, it is assumed that the non-illustrated bonds are hydrogen. Thus, besides the bond to the nitrogen, only one “group” is bonded to each “benzene” ring.

In contrast, the compounds disclosed in Ueda have more than one group bonded to the “benzene” ring. For example, compound 22 has an additional “benzene” ring and an additional methyl group bonded to each central “benzene” ring. The other cited compounds similarly cite additional bonded groups. Accordingly, the compounds 22-29 and compounds 39-41 of Ueda do not conform to formula XIX.

In support of the rejection, the Office Action further iterates that the “applicant has failed to present any evidence that the compounds meeting the present claims do not posses[s] a refractive index between 1.30 and 1.55.” First, it should be noted that only compounds that have a refractive index of 1.30 and 1.55 meet the present claims. Therefore, in addition to any claimed structural formulae, compounds anticipating the claims must also have a refractive index of 1.30 and 1.55. Second, it is the Examiner’s burden to show that “each and every element as set forth in the claim is found” in a single prior art reference.<sup>1</sup>

The index of refraction element is especially significant, given its importance and contribution to the art, as discussed above. The Examiner has not shown that any of the

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<sup>1</sup> Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631 (Fed. Cir. 1987); In re Sun, 22 F.3d 1102 at \*2 (Fed. Cir. 1993)

compounds disclosed in Ueda anticipate the index of refraction element of claim 1. Rather, the Office Action has merely made a conclusory statement that the feature is inherent without providing any technical reasoning. As such, the Examiner has not met his burden of illustrating that Ueda anticipates any of the claims of the present application (see, e.g., *Ex Parte Gagnon*, Appeal No. 2006-1562, 2006 WL 2514822 at \*3 (B.P.A.I., February 1, 2006)) (stating that mere conclusory statements of inherency do not illustrate that reference anticipates claim).

Accordingly, Ueda does not anticipate or render obvious claim 1 for at least the reasons discussed above. Similarly, Ueda does not anticipate or render obvious claims 2-7, 9 and 10 due at least to their dependencies from claim 1. Moreover, as discussed above, claims 7, 9 and 10 are not anticipated or rendered obvious by Ueda at least because Ueda seemingly does not disclose or render obvious any of the structural formulae recited in claim 7. As such, withdrawal of the rejection is respectfully requested.

By the Office Action, claims 1-7, 9 and 10 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent Publication No. 2002/0106531 (hereinafter 'Naito').

Claim 1 recites:

A conductor material for LEDs for improving the light outcoupling, wherein the conductor material is at least one of hole conductor material, electron conductor material or emitter material,  
the conductor material comprises at least one conductive fluorinated organic substance having at least one fluorinated alkyl substituent, one fluorinated alkenyl substituent or one fluorinated alkynyl substituent, wherein at least two fluorine atoms are bonded to at least one carbon atom of the fluorinated substituent, and  
the conductive fluorinated organic substance has a refractive index of  $\geq 1.30$  and  $\leq 1.55$ .

In support of the rejection of claim 1, the Office Action has stated that Naito discloses compounds that inherently have an index of refraction between the ranges recited in claim 1 because they are within a formula of a fluorinated alkyl substituent with a general formula of  $C_mF_{m+x}$  described by the Applicant as having the claimed index of refraction property. The Applicant respectfully disagrees.

As discussed at length in the Applicant's Response submitted on December 5, 2008, the Applicant has nowhere stated that every compound having a substituent meeting the claimed formula has a refractive index of  $\geq 1.30$  and  $\leq 1.55$ . Rather, the Specification states that the present invention is directed to conductive fluorinated organic substances with a refractive index of  $\geq 1.30$  and  $\leq 1.55$  that simply include fluorinated substituents. Furthermore, the Applicant's disclosure has given a specific example of a prior art compound meeting the claimed formula,  $\text{CF}_3\text{-CPh}_2\text{-CF}_3$ , that does not provide the benefits of the claimed invention, as it has a high outcoupling loss (see, e.g., Specification, p. 1, line 26 to p. 2, line 9; p. 2, lines 16-17). Indeed, the Specification describes fluorinated organic substances with a refractive index of  $\geq 1.30$  and  $\leq 1.55$  as an improvement over such prior art compounds (see, e.g., Specification, p. 2, lines 6-9; p. 2, lines 16-17). Accordingly, despite the Examiner's assertions otherwise, the Applicant has not stated that every compound having a substituent meeting the claimed formula has a refractive index of  $\geq 1.30$  and  $\leq 1.55$ .

Thus, the Examiner's citation of Naito's disclosure of compounds having a fluorinated alkyl substituent meeting a general formula of  $\text{C}_m\text{F}_{m+x}$  does not indicate that Naito discloses or renders obvious the use of fluorinated organic substances with a refractive index of  $\geq 1.30$  and  $\leq 1.55$ . Moreover, Naito does not teach or render obvious that any of its compounds have a refractive index of 1.30 to 1.55.

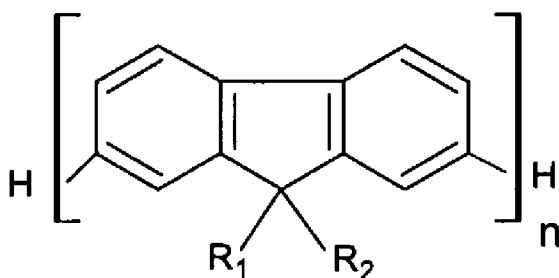
It should also be noted that the Examiner's reliance on In re Fitzgerald, 619 F.2d 67, 70 (CCPA 1980) to assert that it is the Applicant's burden to show that the recited compounds do not have the claimed refractive index is misplaced. As stated above, the general rule is that it is the Examiner's burden to show that "each and every element as set forth in the claim is found" in a single prior art reference. The rule espoused in Fitzgerald was directed to functional process limitations for creating claimed products that were identical or substantially identical. Fitzgerald, 619 F.2d at 70. In particular, the claims and cited reference in Fitzgerald were drawn towards self-locking screw-threaded fasteners that were made in accordance with different processes but were identical or slightly different from each other (see, e.g., MPEP §2112(V); Fitzgerald, 619 F.2d at 70-71). In contrast, the present application does not maintain that the

index of refraction feature is dependent on some specific process of manufacture. Rather, the present invention is directed to a subset of compounds of a claimed formula that have a refractive index within a specific range. Additionally, it should also be noted that the court in In re Best, 562 F.2d 1252 (CCPA 1977) relied on similar reasoning based on functional process limitations. See Best, 562 F.2d at 1255-56. Thus, the burden for establishing that the compounds cited in the prior art inherently have the claimed index of refraction remains on the Examiner.

It is respectfully submitted that the Examiner has not met this burden due to his reliance on the premise that any compound having a fluorinated alkyl substituent with a general formula of  $C_mF_{m+x}$  has the claimed refractive index. As discussed above, the Applicant has nowhere stated that every compound having a substituent meeting the claimed formula has a refractive index of  $\geq 1.30$  and  $\leq 1.55$ . Therefore, the Examiner's citation of Naito's disclosure of compounds having a fluorinated alkyl substituent meeting a general formula of  $C_mF_{m+x}$  does not indicate that Naito discloses or renders obvious the use fluorinated organic substances with a refractive index of  $\geq 1.30$  and  $\leq 1.55$ .

In support of the rejection, the Examiner has also asserted that Naito discloses compounds, H9, that are within formula XX, which has been claimed in claim 7.

Formula XX includes the following:



**Formula XX**

in which R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub>, R<sub>6</sub>, R<sub>7</sub>, R<sub>8</sub> and R<sub>9</sub> are at least partially identical or different and are selected from the group comprising hydrogen, hydroxyl, alkyl, alkenyl, alkynyl, alkoxy, aryl, alkylene, arylene, amines, halogen, carboxylate derivatives, cycloalkyl, carbonyl derivatives, heterocycloalkyl, heteroaryl, heteroarylene, sulfonate,

sulfate, phosphonate, phosphate, phosphine or phosphine oxide, wherein at least one R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub>, R<sub>6</sub>, R<sub>7</sub>, R<sub>8</sub> or R<sub>9</sub> represents a fluorinated alkyl substituent, a fluorinated alkenyl substituent or a fluorinated alkynyl substituent in which at least two fluorine atoms are bonded to at least one carbon atom; and in which n = 1 to 10,000,000.

As discussed at length in the Response submitted on December 5, 2008, Naito does not disclose a conductive material substance that anticipates formula XX, as Naito teaches that H9 is doped with a luminescent dye molecule (see, e.g., Naito, para. 16 and para. 32). In formula XX, each fluorene substituent is consistently bonded to the same R<sub>1</sub> and R<sub>2</sub> groups. Furthermore, the end groups of the molecule or polymer are hydrogen atoms. H9 does not anticipate formula XX because H9 cannot conform to a consistent polyfluorene with consistent R<sub>1</sub> and R<sub>2</sub> groups at the 9-position and with hydrogen as end groups.

Contrary to the Examiner's assertions otherwise (see, e.g., Office Action, p. 12, para. 3), a conductor material with no dopants is recited in the claims. In claim 7, partially reproduced above, each fluorene substituent is consistently bonded to the same R<sub>1</sub> and R<sub>2</sub> groups. Thus, there are no dopants in the claimed formula. Accordingly, Naito does not disclose a conductive material substance that anticipates formula XX for at least the reasons discussed above.

In addition, Naito seemingly does not disclose any conductive material substance that anticipates a formula of a material that has a refractive index of  $\geq 1.30$  and  $\leq 1.55$ . Thus, claim 1 is believed to be patentable over Naito at least because Naito does not disclose or render obvious a fluorinated compound that has an index of refraction of  $\geq 1.30$  and  $\leq 1.55$ . Moreover, claims 2-7, 9 and 10 are believed to be patentable over Naito due at least to their dependencies from claim 1. As such, withdrawal of the rejection is respectfully requested.

By the Office Action, claims 1-6, 9 and 10 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent Publication No. 2003/0091861 (hereinafter 'Okada').

Claim 1 recites:

A conductor material for LEDs for improving the light outcoupling, wherein the conductor material is at least one of hole conductor material, electron conductor material or emitter material,



the conductor material comprises at least one conductive fluorinated organic substance having at least one fluorinated alkyl substituent, one fluorinated alkenyl substituent or one fluorinated alkynyl substituent, wherein at least two fluorine atoms are bonded to at least one carbon atom of the fluorinated substituent, and the conductive fluorinated organic substance has a refractive index of  $\geq 1.30$  and  $\leq 1.55$ .

In support of the rejection of claim 1, the Examiner has stated that Okada discloses compounds that inherently have an index of refraction between the ranges recited in claim 1 because they are within a formula described in the Specification as having the claimed index of refraction property. Specifically, the Examiner has asserted that Okada discloses compounds that have a fluorinated alkyl substituent of the general formula  $C_mF_{m+x}$ . However, as discussed above, the Specification does not state that all molecules or polymers with one or more fluorinated substituents have a refractive index of between 1.30 and 1.55. Furthermore, it is clear to one of ordinary skill in the art that not all molecules or polymers with one or more fluorinated substituents has a refractive index of between 1.30 and 1.55. Accordingly, the Examiner may not rely on a disclosure of a fluorinated alkyl substituent as anticipating the feature of a conductive fluorinated organic substance that has a refractive index of  $\geq 1.30$  and  $\leq 1.55$ . In addition, Okada seemingly does not disclose any conductive material substance whatsoever that anticipates a formula of a material that has a refractive index of  $\geq 1.30$  and  $\leq 1.55$ .

Thus, claim 1 is believed to be patentable over Okada for at least the stated reasons. Moreover, claims 2-6, 9 and 10 are believed to be patentable over Okada due at least to their dependencies from claim 1. As such, withdrawal of the rejection is respectfully requested.

**Rejections of claims under 35 U.S.C. §103(a)**

By the Office Action, claim 7 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Okada in view of U.S. Patent Publication No. 2002/0028329 (hereinafter 'Ise').

In support of the rejection of claim 7, the Examiner has stated that Okada discloses aryl compounds with benzoimidazole derivatives with carbon of the benzene ring replaced by nitrogen. In addition, the Examiner has stated that Okada does not disclose an aryl compound with benzoimidazole derivatives with no additional nitrogen atoms (116). To cure the deficiencies of Okada, the Examiner cites Ise, stating that because Ise teaches similar aryl compounds with benzoimidazoles with and without an additional nitrogen atom, one of ordinary skill in the art would conceive of using formula X recited in claim 7.

However, it is respectfully submitted that claim 7 is patentable over the references due at least to its dependency from claim 1. In addition, it is also respectfully submitted that while Ise teaches that other aryl compounds with benzoimidazoles may be used with and without an additional nitrogen atom, Ise does not teach or remotely suggest that the fluorinated aryl compound 116 of Okada may be used without an additional nitrogen atom. As discussed above and in the Specification, fluorinated organic substances have different outcoupling effects than other known compounds. Thus, interchangeability between the cited non-fluorinated compounds cannot be applied to fluorinated compounds recited in claim 7. Furthermore, the Examiner has not shown that the references have provided any indication that the interchangeability applies to the fluorinated compounds recited in claim 7. Accordingly, claim 7 is not obvious in view of the references. As such, withdrawal of the rejection is respectfully requested.

By the Office Action, claim 8 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Naito.

In support of the rejection of claim 8, the Examiner has stated that Naito discloses a polyfluorene with two fluorinated butyl substituents in the 9-position, referencing H9 of Naito. In addition, the Examiner states that it would be obvious to one of skill in the art to employ fluorinated octyl groups as recited in claim 8, seemingly referring to formula XXVI, because fluorinated butyl groups and fluorinated octyl groups are homologs.

However, it is respectfully submitted that claim 8 is patentable over the cited references due at least to its dependency from claim 1. In addition, it is also respectfully submitted that even if the fluorinated butyl substituents of H9 were replaced with fluorinated octyl substituents, the resulting substance would not anticipate formula XXVI. Similar to formula XX, discussed above, each fluorene substituent of formula XXVI is consistently bonded to the same octyl groups. Moreover, the end groups of the molecule or polymer are hydrogen atoms. As discussed above, Naito teaches that H9 is doped with a luminescent dye molecule (see, e.g., Naito, para. 16 and para. 32). Thus, even if fluorinated butyl substituents were replaced with fluorinated octyl substituents in H9, the resulting substance would not anticipate formula XXVI, as the substance cannot conform to a consistent polyfluorene with consistent fluorinated octyl substituents at the 9-position and with hydrogen as end groups. Accordingly, Naito does not render obvious a conductive material substance that anticipates formula XXVI. In addition, Naito does not seemingly disclose or render obvious any other substance claimed in claim 8. Thus, claim 8 is believed to be patentable over Naito for at least the stated reasons. Withdrawal of the rejection is respectfully requested.

**CONCLUSION**

In view of the foregoing amendments and remarks, this application should now be in condition for allowance. A notice to this effect is respectfully requested. If the Examiner believes that the application is not in condition for allowance, the Examiner is requested to call the Applicants' representative at the telephone number indicated below to discuss any outstanding issues relating to the allowability of the application.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicants hereby request any necessary extension of time. If there is an additional fee occasioned by this response, including an extension fee, please charge any deficiency to Deposit Account No. 141270.

Respectfully submitted,

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